External Independent Peer Review by the Center for Independent Experts

Evaluation of the study:
"Recommendations for Excessive Share Limits in the Northeast Multispecies Fishery"

Prepared by

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Final Report

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Acronyms

ACE	Annual catch entitlement
ACL	Annual catch limit
HHI	Herfindahl-Hirschman index
NEFMC	New England Fishery Management Council
NMFS	National Marine Fisheries Service
PSC	Potential sector contribution
TAC	Total allowable catch quota

EXECUTIVE SUMMARY

- The New England Fishery Management Council (NEFMC) is preparing Amendment 18 to the Northeast Multispecies Fishery Management Plan (FMP). Among other things, Amendment 18 would establish an excessive share threshold for the fishery consistent with National Standard 4 of the Magnuson Stevens Fishery Conservation and Management Act. The NEFMC contracted Compass Lexecon to conduct an empirical analysis to determine if excessive shares existed in the fishery today as well as the necessary constraints to prevent accumulation of excessive share in the future. Compass Lexecon submitted its final report to the NEFMC on December 31, 2013.
- The reason for the concern about excessive shares is that the existence of such could allow an economic agent to exercise market power. In the case of the fishery, this could apply not only to the output markets for fish but also to the markets for fishing "rights". If this possibility exists, the economic agent can exploit market power to his advantage which would not be socially desirable.
- The Compass Lexecon report – henceforth the Report - provides an overview of the Northeast multispecies fishery. In fishing year 2011, total landings were over 61 million pounds with associated revenues of more than $ 90 million. In the same year, there were 1,421 limited access eligibilities of which 1,279 were associated with vessels. Over 420 vessels reported revenue from a groundfish trip.
- Prior to May 2010, the fishery was regulated through input controls such as trip limits, days at sea, gear restrictions and area closures.
- Since 2010, the fishery is regulated using output controls. Output is regulated with annual catch limits. Each permit provides an owner a potential sector contribution (PSC) which is a share of the Annual Catch Limit (ACL) for each of the allocated stocks and is based on the catch history of the permit. The permit owners that join together as a sector combine their PSC.
- Sectors are managed by a sector manager who serves as an agent between sectors and the NMFS. Sector managers also coordinate the development of sector operations plans and manage ACE trades. Sectors have limited ability to monitor and enforce compliance by their members and thus are somewhat reliant on moral suasion and reciprocal trust among members. Coordination of activities within a sector may improve economic efficiency through cost savings and enhanced revenues.

- The Report presents limited information on the relevant fisheries. There is little, if any, information on the product markets. No information is provided on cost of production and stock sizes. However, it is understood that profitability is poor and that boats have left the industry in recent years.
- Although information on the fishery is also available from other sources, I believe the Report should present a self contained description of the fishery as background for the analysis to be undertaken.
- The classical definition of rent is defined as the payment to a resource in fixed supply. Rent will exist for any quota that is binding. Moreover, one may distinguish between resource rent and producers' surplus. Producers' surplus consists of the rent that intra-marginal inputs of labour and capital receive so that this may exist even under competitive equilibrium, where resource rent is reduced to zero. These concepts, which are essential for the management of a fishery, are not properly discussed in the Report.
- The analysis of the multi-output production process in the fishery is inadequate. The central issue here is that of selectivity: to what degree are fishermen able to *target* particular stocks?
- A consequence of having a multi-output production function is that the cost function becomes multi output as well so that the cost of harvesting one unit of stock A depends on how much is harvested of other stocks.
- As for economies of scale, these may occur at different levels: the individual boat, the firm, operating several boats, and at the sector level. These economies of scale involve potential efficiency gains. The stronger these potential gains are, the stronger the incentives for industry participants to adjust their business operations.
- A succinct analysis of the "driving" forces of the industry should have been the starting point of the Report. How have incentives changed as a consequence of the regulatory regime shift in 2010 and what impact has this had, and is likely to have, on the structure of the industry? This also depends on the profitability of the sector, including the cost structure, with stock and quota sizes very important factors.
- It is difficult to analyse incentives toward greater concentration of the industry without a clear understanding of what is driving the industry.
- The report provides no information about the basis for setting quotas in this fishery. This is important, not only in light of the rents that can be achieved, but also in terms

of biological sustainability and as a factor that may influence whether quotas are actually harvested.

- The best example of the management of multispecies fisheries with output controls is the British Columbia groundfish fishery. Much information could be gleaned from British Columbia in terms of changes in incentive structures, the potential for efficiency gains and, possibly, also moves towards greater concentration in the industry.
- A multi-output cost function implies a multi-output supply function. In other words, we may be dealing with joint supply functions rather than single supply functions. This would have theoretical ramifications. This is why information about the fisheries is so essential. If there is specialisation, the jointness in output may be less important and much easier to deal with.
- For the final product market, there are two dimensions to the "relevant market", namely a product dimension and a geographic dimension. There are essentially two ways to measure the relevant market. The first is to undertake empirical demand analyses that will give information about own price and cross price elasticities. The second is co-integration studies, where the development in prices over time of different products is subjected to statistical analysis to determine whether they belong to the same market.
- The matter of possible market concentration in the quota market is considered at three levels, the sector level, the in-season ACE lease market and at the level of permit owners.
- The functioning of the sectors appears to be very similar to "fish pools" in Danish groundfish fisheries which are also regulated with output controls. "Fish pools" are voluntary organisations of fishermen/boat owners. An important function of "fish pools" is to facilitate trade or exchange of quotas among member.
- I agree with the conclusion of the Report that sectors do not exercise any kind of market power. However, I believe that, if market power were to be exercised in this market, it would have to be at the sector level.
- In principle, individuals could exercise market power in the ACE markets by acquiring ACE within the fishing year. The Report concludes that "The likelihood of successfully exercising market power by acquiring a large position in one or more stocks' ACE during the fishing year is quite low and would likely be detected if it

were attempted". As information on market transactions for ACE is available, market data should have been used to verify this result.

- Finally, there is the issue as to whether individual permit owners may exercise market power. As information about individuals' ownership of permits is not available, the analysis is on the basis of GroupIDs. The level of concentration is found to be low for all species/stocks, and there is no time trend in the level of concentration across stocks.
- The Report recommends the following: "It is reasonable for the NEFMC to recommend that NMFS establish an excessive-share cap to maintain *unconcentrated* (HHI below approximately 1,500) distribution of PSC by capping individual PSC for each stock that can be conferred to any permit owner". I disagree with this recommendation which I find to be arbitrary as a market may be competitive even with an HHI greater than 1,500. It would be more appropriate to recommend that NMFS *monitors* the industry with respect to competitive behavior should the HHI exceed 1,500 but without any *a priori* explicit trigger for the imposition of an excessive-share cap.
- The Report recommends the following: "We recommend setting an excessive-share cap so that no permit owner owns or controls permits conferring more than 15.5 percent of the PSC for a stock." I disagree also with this recommendation, which I find arbitrary.
- My assessment of this industry is that it is competitive in both output and input markets. For this reason, at present I see no need to introduce an excessive-share cap.
- I recommend that cost data should be collected on an annual basis for a representative sample of vessels. Cost data should also be collected at the sector level.
- I recommend the introduction of improved transferability of potential sector contributions (PSC), including divisibility, which is likely to improve the efficiency of the management system.
- The Report states that quotas may be held back, i.e., unused in attempts to exercise market power. To the extent that unused quota is an issue in this fishery, and not caused e.g. by low profitability, the fisheries administration may consider whether this is a regulatory instrument it can or should make use of.
- I recommend that the establishment of an ownership registry should be considered. This could be combined with a registry of all ACE transactions both in terms of

quantity and price. An open registry would provide transparency which is important not only for fishermen to make good business decisions, but also for fisheries managers.

I. BACKGROUND

The New England Fishery Management Council (NEFMC) is preparing Amendment 18 to the Northeast Multispecies Fishery Management Plan (FMP). Among other things under consideration, Amendment 18 would establish an excessive share threshold for the fishery consistent with National Standard 4 of the Magnuson Stevens Fishery Conservation and Management Act. To provide the needed expertise to establish an excessive share threshold the NEFMC contracted the economic consulting firm Compass Lexecon to conduct an empirical analysis to determine if excessive shares existed in the fishery today as well as the necessary constraints to prevent accumulation of excessive share in the future. Compass Lexecon completed its study and submitted its final report to the NEFMC on December 31, 2013.

The reason for the concern about excessive shares is that the existence of such could allow an economic agent to exercise market power which means price(s) could be influenced so as to increase profits. In the case of the fishery, this could apply not only to the output markets for fish but also to the markets for fishing "rights", as such rights are required to participate in the fishery (Mitchell and Peterson, 2013, p.2). If this possibility exists, the economic agent can exploit market power to his advantage which would not be socially desirable.

The format and contents of this review are stipulated in annex 1, while the terms of reference are given in appendix 2. This review is organised as follows so as to address these requirements. Section II describes the role of the reviewer in review activities. Section III gives a detailed analysis of the Compass Lexecon report addressing the five points of my terms of reference. Conclusions and recommendations are presented in section IV. In addition, there are an annex and four appendices.

II. DESCRIPTON OF REVIEWER'S ROLE IN REVIEW ACTIVITIES

In May, 2014, I was invited by the Center for Independent Experts (CIE) to join a review panel to provide a peer review of Compass Lexecon's report. The members of the review panel are listed in appendix 3.

As part of my preparations for the assignment, I was provided with the Format and Contents of my report (annex 1), the Terms of Reference for the assignment (appendix 2), Compass Lexecon's report - Mitchell and Peterson (2013) – henceforth referred to as the Report, a background report on the fisheries of the area, NEMFC (2014), and a report by Anderson and Holliday, editors, (2007).

A meeting of the review panel took place in Salem, MA on June 12-13, 2014. The panel review meeting consisted of a session on June 12th that was open to the public and a session on June 13th that was not. The June 12th session (see Appendix 4 for the meeting agenda) began with a presentation provided by Council staff on the purpose and need for the excessive share study of the Northeast Multispecies fishery conducted by Compass Lexecon. This presentation was followed by an overview provided by Compass Lexecon's lead investigators of their methods, data, and findings. Throughout these two presentations the review panel sought clarification on the operational aspects of the Northeast Multispecies Sector Allocation programme as well as Compass Lexecon's procedures in the conduct of the excessive share study. During the afternoon of the 12th the review panel sought additional clarification on each of the panel's terms of reference (TOR) for the peer review. Answers to the panelist's questions were provided by Compass Lexecon's lead investigators, Council staff, Greater Atlantic Regional Fisheries Office (GARFO) staff, and the Northeast Fisheries Science Centre's (NEFMC) Social Sciences Branch (SSB) staff. These deliberations were informed by comments from members of the public in attendance.

On June 13th the review panel met to further discuss the peer review TORs where attendance was limited to the members of the peer review panel, the panel chair, and staff from the Council, GARFO, and NEFSC's SSB.

I actively participated in this meeting, obtaining more relevant information from those present as well as discussing various aspects of the Report with fellow panel members. In addition to this information and that included in the reports referred to above, NEMFC provided additional studies, in particular Anon. (2014) and Murphy *et al.* (2014). I have also consulted other relevant literature as referenced in appendix 2.

III. EVALUATION OF THE STUDY "RECOMMENDATIONS FOR EXCESSIVE SHARE LIMITS IN THE NORTHEAST MULTISPECIES FISHERY"

The Terms of Reference (ToRs) for my evaluation, consisting of five points, are given in appendix 2. I will address each point – to be bolded below – separately.

1. Describe the method or process used by Compass Lexecon for determining the maximum possible allowable percentage share of the market for fishery access privileges and/or quota leasing that would prevent an entity from obtaining an excessive share of access privileges allocated in the Northeast Multispecies Fishery.

Very briefly, the method/process can be outlined as follows:

- A seven-step process was applied to determine an excessive share cap (Report, pp. 3-4 and chapter V).
- The analysis is based upon theoretical work, presented in the Report, and information on product markets and annual catch entitlement (ACE) trading markets obtained from various sources as well as through unstructured voluntary interviews
- The Herfindahl-Hirschman Index (HHI) was used to measure concentration using data provided by NMFS.
- HHI calculated at the Group-ID level for yearly harvest by species (table 1) and yearly ACE holdings by species (table 6) and stock (table 7).
- HHI calculated at sector level for yearly ACE holdings by species (table 3) and stock (table 4).
- Horizontal Merger Guidelines were used to evaluate present levels of HHI. 1,500 was selected as a level consistent with competitive markets.

Many of these issues will be discussed in detail in the following.

The Report also provides an overview of the Northeast multispecies fishery. According to the Report, there are 13 species of groundfish (p. 6); for some species there are several quota allocations. In addition, fishermen may also target non-quota fish stocks. In fishing year 2012, total groundfish landings were over 46 million pounds with associated revenues of almost $ 70 million as compared to almost 62 million pounds in 2011 with associated revenues of $ 90 million. In 2012, non-groundfish landings were 258 million tonnes with revenues of almost $ 236 million. Total gross revenue in 2012 was over $ 305 million, down from almost $ 331 million in 2011, but higher than 200 and 2010 (Murphy *et al.*, 2014).

According to the Report, in 2011, there were 1,421 limited access eligibilities of which 1,279 were associated with vessels. Over 420 vessels reported revenue from a groundfish trip.

Prior to May 2010, the fishery was regulated through input controls such as trip limits, days at sea, gear restrictions and area closures. Since 2010, the fishery is regulated using output controls (see Anderson and Holliday, 2007, and Bjorndal and Munro, 2012, on input and output controls in fisheries). Output is regulated with annual catch limits (ACL). Each permit provides an owner a potential sector contribution (PSC) which is a share of the Annual

Catch Limit (ACL) for each of the allocated stocks and is based on the catch history of the permit. The permit owners that join together as a sector combine their PSC. Based on the combined PSC for each stock, the sectors are allocated ACE. Each sector can determine how to allocate its ACE among its members; usually this is in proportion to the PSC each contributed to the sector (Report, pp. 8-9). Boats and sectors are free to trade ACE, however, these are in- season/year trades, while permanent leases or sales are not permitted. A permit can be sold with all the PSC for relevant species attached.

Sectors are managed by a sector manager who serves as an agent between sectors and the NMFS (Holland et al., 2014). Sector managers also coordinate the development of sector operations plans and manage ACE trades, among other duties. Twelve of 17 sectors were organised under the Northeast Seafood Coalition, a large and emergent fishermen's organization in New England. According to Holland *et al.* (2014), sectors have limited ability to monitor and enforce compliance by their members and thus are somewhat reliant on moral suasion and reciprocal trust among members. Economic performance may be improved by cooperation and information sharing within and amongst sectors.

Holland *et al.* (2014) point out that coordination of activities within a sector may improve economic efficiency through cost savings and enhanced revenues. An example of the latter is marketing cooperatives: one has already been set up by the Port Clyde sector, while New Hampshire sector members are in the process of setting up a cooperative. This mechanism is known also from other countries (Bjorndal and Munro, 2012).

Membership of a sector is voluntary. Permit owners accounting for approximately 98 percent of access privileges have joined sectors. A large number of very small permit holders continue to operate in a common pool system (Report, p. 9). Their combined harvest of groundfish is negligible, however, their harvest of non-groundfish is fairly substantial (Murphy *et al.,* 2014).

The Report presents limited information on the relevant fisheries. There is little, if any, information on the product markets in terms of geography, products, product forms and possible substitutes, market niches (supermarkets, restaurants, hospitality etc.), quantities (domestic landings and imports from elsewhere) and product prices. In terms of the fisheries, no information is provided on cost of production and stock sizes, although it is understood that data availability may be limited. In most years, many or possibly even most quotas are not harvested. Moreover, it is understood that profitability is poor and that boats have left the industry in recent years (Murphy *et a*l., 2014).

Although information on the fishery is available in NEMFC (2014), Murphy *et al.* (2014) and Anon. (2014), I believe the Report should present a self contained description of the fishery as background for the analysis to be undertaken.

2. Evaluate the strengths and weaknesses of the proposed method or process developed by Compass Lexecon (e.g., whether defining excessive shares in terms of market power is appropriate and adequate). Evaluate whether the approach outlined by Compass Lexecon is reasonable for setting excessive share limits in fisheries managed through catch shares in general. As part of this TOR, comment on any constraints that may hinder application of the proposed approach.

The authors state that, under certain conditions, a fishery will produce "economics rents" which is "…a payment to a factor of production in excess of the payment required to keep that factor at its current use" (Report, p. 8). This definition is not very precise and does not distinguish between different types of rent that can exist in a fishery.

The concept of resource rent extends from the more general concept of rent. The classical definition of rent is defined as the payment to a resource in fixed supply (Robinson, 1939). As Arnason (2011) illustrates, assuming a profitable fishery, there will be positive rent for any quota set at a binding level. Moreover, Arnason distinguishes between resource rent and producers' surplus. Producers' surplus consists of the rent that intra-marginal inputs of labour and capital receive so that this may exist even under competitive equilibrium, where resource rent is reduced to zero.

Copes (1972) argues that the benefits to society of renewable resources are maximised when resource rent, consumer surplus and producer surplus are taken into consideration in resource harvesting. These concepts, which are essential for the management of a fishery, are not properly discussed in the report.

The analysis of the production process in the fishery is inadequate. According to the Report, there are 13 species of groundfish (Report, p. 6); although there are more quota allocations. In addition, fishermen also target non-groundfish stocks. The central issue here is that of selectivity: to what degree are fishermen able to *target* particular stocks? (Pascoe, Koundouri and Bjorndal, 2007). Only limited information is provided, but the Report talks about "choke stocks" so that once the quota for one fishery is reached, all (or several) fisheries are closed; however, they also say that "…different fishermen have different

abilities to selectively target species while avoiding catching a limited stock…." (Report, p. 29). According to Murphy *et al.* (2014), the groundfish fishery is carried out using both fixed gears and trawl gears, where fixed gears include gillnet and hook gears such as bottom longline, tub trawls and rod and reel. These different technologies are likely to have different selectivity.

A consequence of having a multi-output production function is that the cost function becomes multi output as well so that the cost of harvesting one unit of stock A depends on how much is harvested of other stocks (Bjorndal and Gordon, 2001).

As for economies of scale, these may occur at different levels. For the individual boat, unit cost of harvesting is likely to decrease as output (harvest) is expanded – at least up to a certain level. A firm, operating several boats, may also experience economies of scale: by increasing the number of boats, the firm may be able to avail itself of more specialised factors of production as well as make more efficient use of inputs. At the sector level, there are also likely to be economies of scale: setting up a sector implies set up (fixed) costs so that an increase in the number of boats belonging to the sector will reduce average cost. These economies of scale involve potential efficiency gains. The stronger these potential gains are, the stronger the incentives for industry participants to adjust their business operations provided this is feasible within the given regulatory framework.

As a minimum, I would have expected a very thorough discussion of these issues. Moreover, it must be kept in mind that targeting is very much a dynamic concept. First, selectivity may be less of a problem in some geographical areas than in others as well as during some parts of the year. Second, if one quota is particularly constraining, there will be incentives to improve gear selectivity so as to lessen the impact of this constraint. In other words, there is scope for specialisation and more so in the long run than in the short run.

In addition to these multispecies interactions in the production function, it may also be the case that there are biological interactions between the species in terms of growth. No information is provided about this.

What should have been the starting point of the report is a succinct analysis of the "driving" forces of the industry. How have incentives changed as a consequence of the regulatory regime shift in 2010 and what impact has this had, and is likely to have, on the structure of the industry? This, of course, also depends on the profitability of the sector, including the cost structure, with stock and quota sizes very important factors. According to Murphy *et al.* (2014), the total number of active groundfish vessels in the fishery continues to decline; the fishery lost 152, or 16.6%, of its active vessels over the 2009-2012 period, and

consolidation in the industry continues. For the vessels remaining in the fishery, the percentage enrolled in sectors is increasing while the percentage remaining in the common pool is declining.

It is difficult to analyse incentives toward greater concentration of the industry without a clear understanding of what is "driving" the industry.

The bioeconomic literature, emphasising the open access fishery, is briefly summarised (Report, p. 7). There are few references to this literature, except for Scott Gordon (1954) and Clark (1990). Although those are seminal contributions, they do not in any way provide a comprehensive review of the relevant literature.

A bioeconomic model is a combination of a model of population dynamics and an economic model of the fishery. As for regulatory regimes, two "extremes" are often considered. One is the common pool (open access) equilibrium, corresponding to what the authors denote the "competitive" equilibrium. For this outcome, resource rent is fully dissipated, while there may be intramarginal rent (and consumers' surplus).

The other "extreme" is the outcome associated with a sole owner, or social planner. Essentially this aims at maximising the total rents from the fishery (resource rent and producers' surplus), either in a static or a dynamic context. Most real world management regimes will lie somewhere between these two outcomes.

Models of this nature, including for multispecies fisheries, are developed and described in Bjorndal and Munro (2012).

A bioeconomic model can also be used to derive a supply curve for a fishery. The open access supply curve was first derived by Copes (1970). Bjorndal and Nostbakken (2003) estimate an empirical supply curve for North Sea herring. For the sole owner, there is no supply curve as such but rather a supply point.

This theory is relevant to the current analysis in several ways. First, the authors use "general" supply curves from microeconomic theory but without any reference to the underlying bioeconomics. Moreover, dynamics is an integral part of supply in a fishery: if sustainable supply from a stock is to be changed, this can only take place over time as stock size is allowed to adjust.

It is pointed out that while the fishery may be regulated with the goal of "maximising the economic value", it may also be regulated for the maximum sustainable yield or "according to other biological standards" (Report, p. 8). This is, of course, correct, however, we are not told on what basis quotas are set in this fishery. This is important, not only in light of the rents that can be generated, but also in terms of biological sustainability and as a factor

that may influence whether quotas are actually harvested. There is no information about the status of relevant fish stocks and what implication this has for the setting of quotas.

3. Evaluate application of the proposed methods or process to the Northeast Multispecies Fishery. Are Compass Lexecon's conclusions regarding market power in both the final product (seafood) and production (quota) market valid and based on appropriate economic principles? If there is disagreement with what Compass Lexecon recommended, clearly state that and your reason why.

The best example of the management of multispecies fisheries with output controls is the British Columbia groundfish fishery. This fishery is prosecuted by a large number of vessels, representing different technologies, and covers many different stocks distributed over large areas. When individual transferable quotas were introduced in 1997, total allowable catch limits (TACs) were established for 55 stocks. Over time capacity in the fishery has declined. Moreover, many vessels have specialised, either in area or species, which has also led to important efficiency gains. This case study is briefly described by Bjorndal and Munro (2012); see also Turris (2000).

Fishing rights are more easily transferable in British Columbia than in the Northeast multispecies fishery. Nevertheless, much information could be gleaned from British Columbia in terms of changes in incentive structures, the potential for efficiency gains and, possibly, also moves towards greater concentration in the industry.

As noted above, a multi-output production function implies a multi-output cost function. This in turn implies a multi-output supply function. In other words, we may be dealing with joint supply functions rather than single supply functions. This would have theoretical ramifications. This is why information about the fisheries is so essential. If there is specialisation, the jointness in supply may be less important and much easier to deal with.

As for the final product market, as the Report states, there are two dimensions to the "relevant market", namely a product dimension and a geographic dimension (Report, pp. 21-22). There are essentially two ways to measure the relevant market (Asche and Bjorndal, 2011, ch. 7). The first is to undertake empirical demand analyses that will give information about own price and cross price elasticities (as well as income elasticities). The second is called co-integration studies, where the development in prices over time of different products

is subjected to statistical analysis to determine whether they belong to the same market. Neither approach is used in this study, however, with time and budget limitations, that would also not be expected. Nevertheless, the analysis is not satisfactory.

To measure market power in the markets for fish, the Report uses landings concentrations for group IDs by species and fishing year which except for two cases gives an HHI of less than 1,500 (table 1, Report, p. 27). The number of Group IDs ("firms") is seen to be reasonably large. I do not find this approach to be adequate as the basis for determining that market power does not exist in these markets.

First, as a minimum, the authors could have obtained some information about the quantity of imports of some, if not all, species in question[1]. This could have been done with relative ease and would have given information about the "market share" for landings from the Northeast[2]. Second, a literature study on demand and market integration studies could have been undertaken. Although the geographical markets covered by this Report may not have been subjected to such studies, several studies include many groundfish species; e.g. cod and hake have been extensively studied (see e.g. Nielsen, Smith and Guillen, 2009, for a fairly recent example).

My *a priori* hypothesis is that many of the products listed in table 1 are in the same market (e.g. all the flounders and plaice). In addition, there is likely to be close substitutes not listed in table 1. Although this hypothesis could not be corroborated by econometric methods, due to time and resource constraints, it would have been possible to get a much better understanding of the relevant markets by the fairly simple procedures I have outlined.

Then to the matter of possible market concentration in the quota market. This matter is considered at three levels, the sector level, the in-season ACE lease market and at the level of permit owners.

The first question relates to possible actions by sectors: "If sectors were to combine members' ACE holdings and market them jointly, there would be concerns regarding the effect of this conduct on competition (and it may also raise potential legal concerns….)" (Report, p. 32).

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[1] According to the Report, "…we relied upon … import/export data….." (Report, p. 4). Presumably this refers to trade data, however, no quantitative data on imports/exports are presented.

[2] According to Anon. (2014), there are indications of loss of market share and processing capacity because Northeast groundfish is not currently a reliable supply for market.

The Report indicates that sectors do not exercise market power. This is done by considering ACE holdings concentrations of sectors, by species and year (Report, table 3), ACE holdings concentrations for sectors, by species/stocks and years (Report, table 4) as well as the number of sector "firms" by species/stocks and years (Report, table 5). Moreover, it is reported that "…discussions with sector managers and others indicate, without exception, that sectors do *not*, in fact, operate to maximise the joint value of the ACE allocated to the sector" (Report, p. 32).

The functioning of sectors appears to be very similar to "fish pools" in Danish groundfish fisheries which are also regulated with output controls (Asche, Bjorndal and Bjorndal, 2014). "Fish pools" are voluntary organisations of fishermen/boat owners. There are several such "pools" and fishermen may move from one pool to another if they are not satisfied with the organisation. An important function of "fish pools" is to facilitate trade or exchange of quotas among member.

I agree with the conclusion of the Report that sectors do not exercise any kind of market power. This is supported by Holland *et al*. (2014) who state that sectors have limited ability to monitor and enforce compliance by their members. However, I believe that, if market power were to be exercised in this market, it would have to be at the sector level. This would, of course, imply that sectors would assume other roles than they do today, in particular, be able to coordinate sector members activities in a way that does not happen now, which would also have legal implications. Nevertheless, fisheries authorities may wish to consider this in the future as is also acknowledged in the Report (Report, p. 48). The activities of quota banks, which may be state owned or private (NEMFC, 2013), would also need to be considered in this regard.

In principle, individuals could exercise market power in the ACE markets by acquiring ACE within the fishing year (Report, p. 33). As for this type of market power, it is concluded that "The likelihood of successfully exercising market power by acquiring a large position in one or more stocks' ACE during the fishing year is quite low and would likely be detected if it were attempted" (Report, p. 34). I believe this is a correct observation, however, it should and could have been established on a much stronger foundation. Apparently ACE transactions are observable, so that market data could have been used to verify this result. Moreover, a thorough analysis of the actual industry structure and what I have previously referred to as the "driving" forces of the industry would also have given useful information that could help corroborate this result.

Finally, there is the issue as to whether individual permit owners may exercise market power. This comes about because "…the sector system would allow an entity with a large share of the PSC for a stock or stocks to control a large ACE position if the entity owned permits that provided a large PSC position" (Report, p. 35). As complete information about ownership of permits is not available, the analysis is on the basis of what is called GroupIDs. The Report evaluates ACE holding concentrations for GroupIDS by species, stock and year (Report, tables 7 and 8) and also presents the number of GroupID "firms" by species, stock and year (Report, table 8). The level of concentration is found to be low for all species/stocks, and there is no time trend in the level of concentration across stocks. Also, as the Report points out, the rather broad definition of ownership as represented by the GroupID concept leads to an overstatement of the shares of PSC controlled by individual entities. Finally, the number of GroupID "firms" for the different species/stocks/years varies between 331 and 635 (Report, table 8), which means that a large number of firms is active in the industry. This is supportive of the fact that concentration is low.

As for the recommendations regarding excessive share caps in the fishery, although the Report maintains that no market share is currently exercised in this fishery, the Report gives eight statements (Report, pp. 47-48) that partly summarise some of the Report, and partly provide recommendations. I will in the following comment on these statements, denoted S-1 to S-8, with statements given in italics.

S-1: *The information NMFS has on permit ownership may not be sufficient …. to reliably define ownership and control of permits and the PSC they confer.*

This is an observation rather than a recommendation. I will deal with this under Terms of Reference 4 below.

S-2: *There is sufficient competitive information to determine that the relevant markets for ACE trading are the markets for the trading of each stock's ACE. If an operator requires the ACE for a particular stock, there is not a good substitute available.*

These two sentences appear to be observations rather than recommendations.

S-3: *We cannot exclude the possibility of the exercise of market power as the result of the fishery's output regularly receiving the regulated level, which would indicate competitive conduct within the framework of the output regulation. Thus, examination of appropriate caps is necessary.*

The issue of market power in output markets is discussed above. As stated, my hypothesis is that output markets are competitive.

S-4: *It is reasonable for the NEFMC to recommend that NMFS establish an excessive-share cap to maintain unconcentrated (HHI below approximately 1,500) distribution of PSC by capping individual PSC for each stock that can be conferred to any permit owner*.

S-5: *The cap required to ensure an HHI below 1,500 would be 25 percent with a competitive fringe of 38 percent, or 15.5 percent with no competitive fringe.*

I disagree with both of these recommendations. Although HHI values of less than 1,500 are indicative of an unconcentrated industry, the industry may well remain competitive for HHI values in excess of 1,500. Thus, I find S-4 and S-5 to be somewhat arbitrary. It would be more appropriate to recommend that NMFS *monitors* the industry with respect to competitive behaviour should the HHI exceed 1,500 but without any *a priori* explicit trigger for the imposition of an excessive-share cap.

S-6: *Sectors do no own or control PSC or ACE. Therefore, capping the amount of PSC or ACE held in the aggregate by members of a particular sector would not provide protections against the exercise of market power or the development of inordinate control.*

This issue is discussed above.

S-7: *We suggest using the grouping of permits by common ownership (based on information already available) for an initial determination of whether a permit transfer exceeds a share cap, but allowing for an optional follow-up.*

This is closely related to S-1. It would have been appropriate to combine S-1 and S-7 in one recommendation.

S-8: *We recommend setting an excessive-share cap so that no permit owner owns or controls permits conferring more than 15.5 percent of the PSC for a stock.*

I find S-8, i.e., recommending an excessive-share cap of 15.5 percent of the PSC for a stock, to be arbitrary.

My assessment of this industry is that it is competitive in both output and input markets. This conclusion cannot in any way be drawn only on the basis of the evidence presented in the Report. As I have already pointed out, the Report fails to highlight the driving forces of the industry. My conclusion is based on additional information about the fishery such as NEFMC (2014), Anon. (2014), Murphy *et al.* (2014) and Holland *et al.* (2014) as well as evidence presented at the two-day meeting in Salem, MA. I will in particular draw attention to some stylized facts. The products are sold in competition with imports, for some products probably from both the US and abroad; for products such as cod, haddock and hake there are international markets. In addition, there are numerous other

substitutes some of which may not be fish. Consequently, this industry is likely to be a price taker in output markets.

As for production, although data about stock sizes appears limited, I understand there are indications that many stocks are at low levels, implying high unit cost of harvesting. Moreover, many vessels represent sunk cost and fish as long as revenues cover variable costs. This indicates low profitability. This is supported by the fact that vessels have left the industry in recent years. Despite exit in recent years, it should be noted that the number of operators in the fishery is large.

In many years, all ACLs are not harvested. There may be several reasons for that. Anon. (2014) points to the fact that location of stocks in closed areas may make it difficult to harvest the quotas while lack of transparency in the ACE market may lead to ACE being unused. The latter point is supported by Holland *et al.* (2014), who state that more information and greater transparency in the lease market may imply a potential for efficiency gains in terms of bring quota sellers and buyers together. Holland *et al.* (2014) also point out that sectors could facilitate sharing of information about how to avoid catching species with low quotas which may be particularly important to minimise the degree to which quotas or these species constrain catch of other species for which ACE allocations are not limiting.

Murphy *et al.* (2014) point out that many factors may contribute to the inability of sectors to catch their allocated ACE. This may include search frictions and/or structural impediments, but it may also be due to fish availability and/or imperfect quota setting, and insufficient technology to target particular stocks. At the Salem meeting, participants also indicated that it may not be profitable to harvest the full quotas.

On this background, and my experience from working with many fisheries in different parts of the world over a number of years, leads me to conclude that the industry is competitive. For this reason, at present I see no need to introduce an excessive-share cap.

4. Review and comment on the data requirements necessary for applying the proposed methods or process.

From what I understand, fairly detailed vessel level earnings data are available (landings of different species per unit of time and associated prices), see Murphy *et al*. (2014). Cost data, on the other hand, are not available. Cost and earnings studies are undertaken for fisheries in many countries on a regular basis. As for the Northeast multispecies fishery, such studies

would be very important in terms of understanding the dynamics of the fishery in terms of incentive structure, including towards greater industry concentration.

Cost (and earnings) data at the sector level would also be important.

As has been highlighted above, exact data on individuals' ownership shares do not exist. These data are necessary for a precise evaluation of actual concentration of ownership.

5. Provide any recommendations for further improvement.

I would like to make the following recommendations:

i. Cost data should be collected on an annual basis for a representative sample of vessels. Cost data should also be collected at the sector level.

ii. Improved transferability of potential sector contributions (PSC), including divisibility, is likely to improve the profitability and efficiency of the fishery.

iii. The Report suggests that quotas may be held back, i.e., unused in attempts to exercise market power. In several countries unused quotas may be reallocated towards the end of the season. To the extent that unused quota is an issue in this fishery, and not caused e.g. by low profitability, the fisheries administration may consider whether this is a regulatory instrument it can or should make use of.

iv. Comprehensive ownership data do not exist for PSC so it is not possible to ascertain the exact ownership shares of individuals. It should be considered whether an ownership registry should be established which could be combined with a registry of all ACE transactions both in terms of quantity and price. An open registry would provide transparency which is important not only for fishermen to make good business decisions, but also for fisheries managers[3].

IV. CONLUSIONS AND RECOMMENDATIONS

The Report is a first analysis of current and potential excessive share limits in the Northeast multispecies fishery. I have identified a number of weaknesses with the Report, both in terms of theory and analysis. In particular, I find the recommendation about introduction of an excessive share limit not to be based on sound and thorough analysis and therefore rather arbitrary. Currently, I do not find any basis for introducing an excessive share limit.

[3] According to Anon. (2014), there may be a lack of transparency in the ACE market which in some cases my leave ACE unused.

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Appendix 2: Statement of Work

External Independent Peer Review by the Center for Independent Experts

Evaluation of the study:
"Recommendations for Excessive Share Limits in the Northeast Multispecies Fishery"

Scope of Work and CIE Process: The National Marine Fisheries Service's (NMFS) Office of Science and Technology coordinates and manages a contract providing external expertise through the Center for Independent Experts (CIE) to conduct independent peer reviews of NMFS scientific projects. The Statement of Work (SoW) described herein was established by the NMFS Project Contact and Contracting Officer's Representative (COR), and reviewed by CIE for compliance with their policy for providing independent expertise that can provide impartial and independent peer review without conflicts of interest. CIE reviewers are selected by the CIE Steering Committee and CIE Coordination Team to conduct the independent peer review of NMFS science in compliance with the predetermined Terms of Reference (ToRs) of the peer review. Each CIE reviewer is contracted to deliver an independent peer review report to be approved by the CIE Steering Committee, and the report is to be formatted with content requirements as specified in **Annex 1**. This SoW describes the work tasks and deliverables of the CIE reviewer for conducting an independent peer review of the following NMFS project. Further information on the CIE process can be obtained from www.ciereviews.org.

Project Description: The New England Fishery Management Council (NEFMC) has been developing Amendment 18 to the Northeast Multispecies Fishery Management Plan, and as part of the Amendment, has been attempting to define an "excessive share" threshold for the fishery. All federal fishery management plans must comply with National Standard 4 of the Magnuson Act (16 *U.S.C.* 1851(a)(4)), requiring that fishing privilege allocations be carried out so that "no particular individual, corporation, or other entity acquires an excessive share of such privileges." During the course of the Council's deliberations, it was decided that additional expertise from an external contractor was needed to help determine if excessive shares exist in the fishery today and describe potential constraints that could prevent excessive shares from existing in the future. In order to provide this expertise, the economic consulting firm Compass Lexecon was contracted to give advice on an appropriate excessive share threshold for the Northeast Multispecies Fishery.

Compass Lexecon defined an "excessive share" as a share of access privileges and/or quota leasing that would allow an entity to influence the prices of fishery outputs to its advantage, or to have market power. The research involved receiving input from fishery stakeholders via surveys and interviews and analyzed NMFS fishery data. Compass Lexecon assessed available models for evaluating the presence of market power, and made recommendations with regard to their appropriateness for setting excessive catch share limits.

The work performed could be controversial. Examination of market power has never been formally investigated in this fishery. It recommended methods for determining excessive shares which might be applied in other fisheries. With the increased prevalence of catch share management systems, determining what constitutes an excessive share and whether limits need to be put in place is extremely important, because excessive shares may lead to market

power. Market power can lead to the ability to influence price in either the final product market or in factors of production (i.e. the fish resource). Thus, the study by the Compass Lexecon was innovative and significant.

Compass Lexecon delivered its final report to the NEFMC on December 31, 2013, and a peer review (by the CIE) needs to take place to either endorse or reject their findings. Because Compass Lexecon was contracted by the NEFMC, the Northeast Fisheries Science Center (NEFSC) agreed to coordinate the review of the report on behalf of the NEFMC. The NEFSC has asked the CIE to formally conduct a review of the report.

The Terms of Reference (ToRs) of the peer review are attached in **Annex 2**. The tentative agenda of the panel review meeting is attached in **Annex 3**.

Requirements for CIE Reviewers: Three CIE reviewers shall conduct an impartial and independent peer review in accordance with the SoW and ToRs herein. CIE reviewers shall have working knowledge and recent experience in the application of economics, with specific expertise in industrial organization. The reviewers should have theoretical and empirical expertise in the economics of market structure/conduct/performance, particularly monopoly/oligopsony, antitrust, firm strategy, and government regulation. Experience conducting studies using econometric models and/or index-based assessments of market concentration and market power would be useful. Experience with markets operating under government permits such as production permit or marketing orders in agriculture, bandwidth for TV and radio, and tradable permit systems would be desirable. Empirical studies of market structure in renewable resource industries would be desirable as would an understanding of the statutory context for antitrust regulation. Each CIE reviewer's duties shall not exceed a maximum of 16 days to complete all work tasks of the peer review described herein.

Not covered by the CIE, the CIE chair's duties should not exceed a maximum of 16 days (i.e., several days prior to the meeting for document review; the CIE panel meeting; several days following the panel meeting for Summary Report preparation).

Location of Peer Review: Each CIE reviewer shall conduct an independent peer review during the panel review meeting. A meeting room has been reserved at the Hawthorne Hotel, 18 Washington Square West, Salem, Massachusetts 01970 on June 12 and 13, 2014.

Statement of Tasks: Each CIE reviewer shall complete the following tasks in accordance with the SoW and Schedule of Milestones and Deliverables herein.

1. Prior to the Peer Review Meeting:

Upon completion of the CIE reviewer selection by the CIE Steering Committee, the CIE shall provide the CIE reviewer information (full name, title, affiliation, country, address, email, FAX) to the COTR, who forwards this information to the NMFS Project Contact no later the date specified in the Schedule of Milestones and Deliverables. The CIE is responsible for providing the SoW and ToRs to the CIE reviewers. The NMFS Project Contact is

responsible for providing the CIE reviewers with the background documents, reports, foreign national security clearance, and other information concerning pertinent meeting arrangements. The NMFS Project Contact is also responsible for providing the Chair (see below) a copy of the SoW, background documents and final report in advance of the panel review meeting. Any changes to the SoW or ToRs must be made through the COTR prior to the commencement of the peer review.

Foreign National Security Clearance: When CIE reviewers participate during a panel review meeting at a government facility, the NMFS Project Contact is responsible for obtaining the Foreign National Security Clearance approval for CIE reviewers who are non-US citizens. For this reason, the CIE reviewers shall provide requested information (e.g., first and last name, contact information, gender, birth date, passport number, country of passport, travel dates, country of citizenship, country of current residence, home country, and FAX number) to the NMFS Project Contact for the purpose of their security clearance, and this information shall be submitted at least 30 days before the peer review in accordance with the NOAA Deemed Export Technology Control Program NAO 207-12 regulations available at the Deemed Exports NAO website: http://deemedexports.noaa.gov/sponsor.html.

Pre-review Background Documents: Approximately two weeks before the peer review, the NMFS Project Contact will send (by electronic mail or make available at an FTP site) to the CIE reviewers the necessary background information and reports for the peer review. In the case where the documents need to be mailed, the NMFS Project Contact will consult with the CIE Lead Coordinator on where to send documents. CIE reviewers are responsible only for the pre-review documents that are delivered to the reviewer in accordance to the SoW scheduled deadlines specified herein. The CIE reviewers shall read all documents in preparation for the peer review.

2. During the Panel Meeting

Panel Review Meeting: Each CIE reviewer shall conduct the independent peer review in accordance with the SoW and ToRs, and shall not serve in any other role unless specified herein. **Modifications to the SoW and ToRs can not be made during the peer review, and any SoW or ToRs modifications prior to the peer review shall be approved by the COR and CIE Lead Coordinator.** Each CIE reviewer shall actively participate in a professional and respectful manner as a member of the meeting review panel, and their peer review tasks shall be focused on the ToRs as specified herein. The NMFS Project Contact is responsible for any facility arrangements (e.g., conference room for panel review meetings or teleconference arrangements). The NMFS Project Contact is responsible for ensuring that the Chair understands the contractual role of the CIE reviewers as specified herein. The CIE Lead Coordinator can contact the Project Contact to confirm any peer review arrangements, including the meeting facility arrangements.

(Review Meeting Chair)

A member of the New England Fishery Management Council's Scientific and Statistical Committee will serve as Chairperson. The role of the Chair is to facilitate the meeting, which includes coordination of presentations and discussions, and making sure all Terms of Reference are reviewed. Additionally, the Chair shall prepare the summary report from the meeting. During the meeting, the Chair can ask questions or make statements to clarify

discussions, and he can move the discussion along to ensure that the CIE reviewers address all of the TORs.

(CIE Reviewers)

Each CIE reviewer shall participate as a peer reviewer in a panel discussion centered on a report furnished to the NEFMC by Compass Lexecon regarding excessive shares in the Northeast Multispecies Fishery. Reviewers are to determine whether the findings of the Technical Group are valid given the Terms of Reference provided to the expert panel. If reviewers consider the recommendations of the expert panel to be inappropriate, the reviewers should recommend an alternative.

(Compass Lexecon)

A representative from Compass Lexecon shall provide a presentation of their final report. During the question and answer period, the Compass Lexecon representative will be available to answer questions about the report. The CIE members can provide feedback to Compass Lexecon at that time.

(Other Panel Members)

A staff representative from the NEFMC and from the NEFSC Social Sciences Branch will be available during the meeting to provide any additional information requested by the CIE reviewers. These other panel members may assist the Chair in preparing the summary report, if requested.

(Public)

Day 1 of the panel meeting will be open to the public to attend as observers. The agenda will allow for limited public comment.

3. After the Open Meeting

Contract Deliverables - Independent CIE Peer Review Reports: Each CIE reviewer shall complete an independent peer review report in accordance with the SoW. Each CIE reviewer shall complete the independent peer review according to required format and content as described in Annex 1. Each CIE reviewer shall complete the independent peer review addressing each ToR as described in Annex 2.

Other Tasks – Contribution to Summary Report: The Chair from the SSC and CIE reviewers will prepare the Peer Review Summary Report. Each CIE reviewer will discuss whether they hold similar views on each Term of Reference and whether their opinions can be summarized into a single conclusion for all or only for some of the Terms of Reference. For terms where a similar view can be reached, the Summary Report will contain a summary of such opinions. In cases where multiple and/or differing views exist on a given Term of Reference, the Report will note that there is no agreement and will specify - in a summary manner – what the different opinions are and the reason(s) for the difference in opinions.

The Chair's objective during this Summary Report development process will be to identify or facilitate the finding of an agreement rather than forcing the panel to reach an agreement. The Chair will take the lead in editing and completing this report. The Report (please see Annex 1 for information on contents) should address whether each Term of Reference was completed successfully. For each Term of Reference, this report should state why that Term of Reference was or was not completed successfully.

Specific Tasks for CIE Reviewers: The following chronological list of tasks shall be completed by each CIE reviewer in a timely manner as specified in the **Schedule of Milestones and Deliverables**.

1) Conduct necessary pre-review preparations, including the review of background material and reports provided by the NMFS Project Contact in advance of the peer review.
2) Participate during the panel review meeting in Salem, Massachusetts during June 12-13, 2014 as specified herein, and conduct an independent peer review in accordance with the ToRs (**Annex 2**).
3) No later than 27 June, 2014, each CIE reviewer shall submit an independent peer review report addressed to the "Center for Independent Experts", and the report should be sent to Dr. Manoj Shivlani, CIE Lead Coordinator, via email to shivlanim@bellsouth.net, and Dr. David Sampson, CIE Regional Coordinator, via email to david.sampson@oregonstate.edu. Each CIE report shall be written using the format and content requirements specified in **Annex 1**, and address each ToR in **Annex 2**.

Schedule of Milestones and Deliverables: CIE shall complete the tasks and deliverables described in this SoW in accordance with the following schedule.

5 May 2014	CIE sends reviewer contact information to the ST Coordinator, who then sends this to the NMFS Project Contact
26 May 2014	NMFS Project Contact sends the CIE Reviewers the pre-review documents
12-13 June 2014	Each reviewer participates and conducts an independent peer review during the two-day panel review meeting
27 June 2014	CIE reviewers submit draft CIE independent peer review reports to the CIE Lead Coordinator and CIE Regional Coordinator
7 July 2014	Draft of Summary Report, reviewed by all CIE reviewers, due to panel Chair *
14 July 2014	Panel Chair send final Summary Report, approved by CIE reviewers, to NEFSC contact
14 July 2014	CIE submits CIE reports to the ST Coordinator
21 July 2014	The ST Coordinator distributes the final CIE reports to the NMFS Project Contact and regional Center Director

*The Summary report will not be submitted, reviewed, or approved by the CIE

Modifications to the Statement of Work: Requests to modify this SoW must be approved by the Contracting Officer at least 15 working days prior to making any permanent substitutions. The Contracting Officer will notify the COR within 10 working days after receipt of all required information of the decision on substitutions. The COR can approve changes to the milestone dates, list of pre-review documents, and ToRs within the SoW as long as the role and ability of the CIE reviewers to complete the deliverable in accordance with the SoW is not adversely impacted. The SoW and ToRs shall not be changed once the peer review has begun.

Acceptance of Deliverables: Upon review and acceptance of the CIE independent peer review reports by the CIE Lead Coordinator, Regional Coordinator, and Steering Committee, these reports shall be sent to the COR for final approval as contract deliverables based on compliance with the SoW and ToRs. As specified in the Schedule of Milestones and Deliverables, the CIE shall send via e-mail the contract deliverables (CIE independent peer review reports) to the COR (William Michaels, via William.Michaels@noaa.gov).

Applicable Performance Standards: The contract is successfully completed when the COTR provides final approval of the contract deliverables. The acceptance of the contract deliverables shall be based on three performance standards:
(1) each CIE report shall completed with the format and content in accordance with **Annex 1**,
(2) each CIE report shall address each ToR as specified in **Annex 2**,
(3) the CIE reports shall be delivered in a timely manner as specified in the schedule of milestones and deliverables.

Distribution of Approved Deliverables: Upon acceptance by the COR, the CIE Lead Coordinator shall send via e-mail the final CIE reports in *.PDF format to the COR. The COR will distribute the CIE reports to the NMFS Project Contact and Center Director.

Support Personnel:

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Key Personnel:

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NEFMC Staff Contact:

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Annex 1: Format and Contents of CIE Independent Peer Review Report

1. The CIE independent report shall be prefaced with an Executive Summary providing a concise summary of the findings and recommendations in accordance with the ToRs.

2. The main body of the reviewer report shall consist of a Background, Description of the Individual Reviewer's Role in the Review Activities, Summary of Findings for each ToR in which the weaknesses and strengths are described, and Conclusions and Recommendations in accordance with the ToRs.

   a. Reviewers should describe in their own words the review activities completed during the panel review meeting, including providing a brief summary of findings, of the science, conclusions, and recommendations.

   b. Reviewers should discuss their independent views on each ToR even if these were consistent with those of other panelists, and especially where there were divergent views.

   c. Reviewers should elaborate on any points raised in the Summary Report that they feel might require further clarification.

   d. Reviewers shall provide a critique of the NMFS review process, including suggestions for improvements of both process and products.

   e. The CIE independent report shall be a stand-alone document for others to understand the weaknesses and strengths of the science reviewed, regardless of whether or not they read the summary report. The CIE independent report shall be an independent peer review of each ToRs, and shall not simply repeat the contents of the summary report.

3. The reviewer report shall include the following appendices:

   Appendix 1: Bibliography of materials provided for review
   Appendix 2: A copy of the CIE Statement of Work
   Appendix 3: Panel Membership or other pertinent information from the panel review meeting.

Annex 2: Terms of Reference for the Peer Review

Evaluation of the study:
"Recommendations for Excessive-Share Limits in the Northeast Multispecies Fishery"

The peer review shall be conducted based on the following Terms of Reference (ToRs):

1. Describe the method or process used by Compass Lexecon for determining the maximum possible allowable percentage share of the market for fishery access privileges and/or quota leasing that would prevent an entity from obtaining an excessive share of access privileges allocated in the Northeast Multispecies Fishery.

2. Evaluate the strengths and weaknesses of the proposed method or process developed by Compass Lexecon (e.g., whether defining excessive shares in terms of market power is appropriate and adequate). Evaluate whether the approach outlined by Compass Lexecon is reasonable for setting excessive share limits in fisheries managed through catch shares in general. As part of this TOR, comment on any constraints that may hinder application of the proposed approach.

3. Evaluate application of the proposed methods or process to the Northeast Multispecies Fishery. Are Compass Lexecon's conclusions regarding market power in both the final product (seafood) and production (quota) market valid and based on appropriate economic principles? If there is disagreement with what Compass Lexecon recommended, clearly state that and your reason why.

4. Review and comment on the data requirements necessary for applying the proposed methods or process.

5. Provide any recommendations for further improvement.

Appendix 3: Panel Membership

Review Panel Chair

Dr. Eric Thunberg
(NEFMC Science and Statistical Committee
NOAA HQ Office of Science & Technology

Review Panelists

Dr. Trond Bjorndal
SNF Centre for the Applied Research at NHH
Bergen, Norway

Dr. Jamie Brown Kruse
Director, Center for Natural Hazards Research,
East Carolina University
Greeneville, NC USA

Dr. Andrew Schmitz
Department of Food and Resource Economics
University of Florida
Gainesville, FL USA

Dr. Quinn Weninger
Department of Economics
Iowa State University
Ames, Iowa USA

Appendix 4: Review Panel Meeting Agenda

Location: Hawthorne Hotel, 18 Washington Square West, Salem, MA 01970

Date: June 12-13, 2014

Day 1: Thursday June 12

9:00 Opening, Panel Chair (Eric Thunberg, Panel Chair)

- Welcome
- Introduction
- Agenda overview
- Conduct of meeting

9:15 Background and Need for Compass Lexecon Report and Introduction of Compass Lexecon (Rachel Feeney, NEFMC Staff; Chad Demarest, NEFSC))

9:35 Report of Compass Lexecon (Steve Peterson and/or Glenn Mitchell)

10:10 Break

10:25 Review of Terms of Reference – CIE Panel

10:45 Public Comment

11:00 CIE Panel Discussion – ToR #1

12:00 Lunch

1:00 CIE Panel Discussion – ToR #2

1:45 CIE Panel Discussion - ToR #3

3:00 Break

3:15 CIE Panel Discussion - ToR #4

3:45 CIE Panel Discussion – ToR #5

4:15 Public Comment

4:30 CIE Panel Discussion – Outstanding Issues

5:00 Adjourn

Day 2: Friday June 13

8:00 – 2:30 CIE Report Writing – (Only Panel Members, NEFMC and NEFSC staff are admitted)